

CEEN 4960
Senior Thesis Proposal
Team Charter

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Project Approach

Hardware Engineer

The Hardware Engineer will be responsible for two major tasks, PCB or circuitry design and keeping the project modular. I personally have been burned many times because I could not find out where an error was made. While this could have also been a documentation issue, it would have helped to be able to centralize issues in an easier fashion. Making multiple smaller boards that connect together through headers will make debugging much easier than having one big board and trying to hook it up to a logic analyzer all the time. How small this should be broken up will ultimately be up to the Hardware Engineer but the Systems Engineer would work closely at looking at alternatives and suggesting which the best solution is as well.

The PCB design will be handled mainly by the Hardware Engineer also. If any design is made by another member by being delegated by the Hardware Engineer, the Hardware Engineer would check it over and sign off on the design before fabrication. Debugging and testing will be led by this position, but would be supported by the Resource Manager and the Systems Engineer.

Software Engineer

The Software Engineer will handle writing the software in a clean and efficient manor, while also being responsible for configuring any support systems needed for the project. Since this position is the lead programmer, the responsibility of keeping a clean code base will be part of their authority. In the case where code is delegated to either the Resource Manager or Systems Engineer, the Software Engineer will give it a final check before it is committed to the project. They will also check to make sure the code fits with the overall paradigm of clean, readable, testable code.

Another responsibility will be for the Software Engineer to write code using Test Driven Development (TDD). Using TDD helps keep code as complex and short as it needs to be, and no more. It also is a good way to verify that it works. Setting up a framework for TDD will fall on the Software Engineer. The framework will be decided by this position.

Along with the above responsibilities, the Software Engineer, alongside the System Engineer, will decide and configure any type of support software needed, for example a database or website.

Systems Engineer

The Systems Engineer will be viewing the project from very high up. This position has to have the vision to help direct the other three members on where to go next. The Systems Engineer will help both the Software and Hardware Engineers on designing their parts, but will mostly make sure that they are on the right track. This position will also have to be thinking ahead to make

sure the decisions made will help the project progress. The path of the overall design lays mainly on the shoulders of this position, so the final say will be made by the Systems Engineer.

Resource Manager

The Resource Manager is a very functional anchor. While the members of the team are coming up with ways on how the project will work, the Resource Manager has to keep the team from taking on too much. There are development timelines to be met and priorities will have to be made. It will be the Resource Manager who will keep these in mind and help remind the other members of the risks they may be taking.

The Resource Manager will also be the coordinator. This position will keep all team members informed of what the others are doing, to help avoid duplicated work or work focused on a part of the project that has been changed. Sometimes when Engineers get working and focused on a task, they forget to communicate what and why they did it. The Resource Manager will be responsible to help keep communication flowing.

This position will also have to be a jack of all trades. They will have to be ready to support the three other team members when asked. Along with this, they will have to make sure everything is well documented and tested.

Quality Objectives

While there are no objectives set, there is a very generic path to take to get to quality objectives. Designing quality objectives is the first step to designing quality objectives. There will be many ideas that sound good, but will be more flashy than functional. Functionality is the main objective. Functional objectives will be prioritized. Quality objectives also have tests developed in tandem.

Resources Needed

- Computers
- Programming software for any microcontrollers used
- Oscilloscopes
- Logic Analyzers
- Conference room
- Office area for team
- Systems to back up code
- Notebook for documentations
- Space to store hardware
- Soldering irons and solder

Risk Management

Mitigation Steps

To avoid risk, there are many things to consider. A lot of it is project related. First off, try to avoid scope creep. The team must be realistic in deciding on goals. Secondly, there are risks with buying parts or ordering things. Ordering a little extra can help avoid having to wait when parts are broken. This can then lead to money risks, but a well-kept budget will help avoid going over.

Action Steps

To eliminate risks, alternative solutions and testing will be used. Alternative solutions will allow for backup plans if risks become realities. With backup plans, an idea gone badly will not be the end of that idea. Developing testing alongside the designs will help show that a piece of the project does or does not work, eliminating any chance that it will fail in an expected way later.

Use of AHP

AHP will help prioritize the goals of the team. In a big project it is important to decide what is most important. It will also help select the best solution out of any set of alternate solutions. Of course, these selections will all be reviewed and revised if needed.

Project Control

Documentation used in tracking project progress

Documentation will be kept mainly in the lab books. Documentation can also be kept by taking pictures and videos. Code and any electronic schematics or PCB designs will be backed up. Other techniques like WPS and AHP will help too.

Processes used to assist project progress

Using objective trees and AHP to prioritize what will be done first will be utilized to help keep a project on course and progressing. Weekly team updates will also help make sure that the parts that are being worked on and prioritized are going forward. If not, alternate solutions will be revisited and reconsidered.